DIVISION OF RESEARCH AND INNOVATION

I-TEAM BRIEF

The Innovation Team (I-Team) at the Caltrans Division of Research and Innovation, in cooperation with its partners, develops proven, ready-to-deploy innovations in methods, materials, and technologies that enable Caltrans to provide the most effective management of public services, resources, and infrastructure.

NOVEMBER 2010

Updated: January 2011

See-Through Bridge Rails

Enhancing visibility and aesthetics on California roadways

Caltrans initially developed See-Through Bridge Rails in consideration of the California Coastal Act of 1976, which protected the natural beauty of California's coastline and enlisted all public agencies to do the same. ***The Caltrans I-Team supports the use of See-Through Bridge Rails.***

READY TO DEPLOY

See-Through Bridge Rails minimize the impairment of views from the bridge and create aesthetically pleasing views of the bridge from public areas. Numerous designs are already deployed, ready to deploy, and under consideration for approval by the Federal Highway Administration (FHWA).

NEW AND IMPROVED

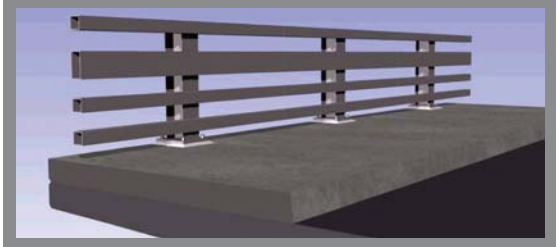
- Enhances visual appeal by applying color, texture, and other treatments
- Designed to have rail heights that are consistent with minimum required height for anticipated users (vehicle, bicycle and/or pedestrians)
- Can be used in any location requiring a Context Sensitive Solution (CSS)
- Can be modified for other uses by special design, including on the roadside (by mounting the rail on a reinforced concrete trench footing or on a trench footing on CIDH piles) and with earth retaining systems (the design needs to consider vehicular impact loads)

California ST-20S Bridge Rail, Van Duzen River Bridge, Humboldt County

About See-Through Bridge Rails

Early aesthetic bridge rails either had limited uses due to safety standards or they elicited concerns over the obstruction of scenic views. Caltrans conducted an intensive study of aesthetic barriers developed by others and identified several potentially improved designs, but each has its own disadvantages. Caltrans and the California Coastal Commission concluded that better aesthetic rail designs need to be developed to meet the needs of local communities in scenic areas. This brief summarizes currently available options.

California ST-50 Bridge Rail



GET STARTED

Contact:
Shannon Post, Office of Design and Technical Services, Division of Engineering Services
shannon_post@dot.ca.gov, 916.227.8070

Greg Kaderabek, Office of Design and Technical Services, Division of Engineering Services
greg_kaderabek@dot.ca.gov, 916.227.8821

Learn More

Caltrans DRI web page:
http://www.dot.ca.gov/newtech/operations/roadsidesafety/aesthetic_bridge_rail/index.htm

FHWA Bridge Rail Guide:
http://www.fhwa.dot.gov/bridge/bridgerail/

AASHTO Bridge Design Specifications:
http://tinyurl.com/aashto-bridge-design

Caltrans Division of Design/Landscape Architecture web page:
http://www.dot.ca.gov/hq/LandArch/barrier_aesthetics/index.htm

Caltrans I-TEAM BRIEF

METRICS

"SEE-THROUGH" ALTERNATIVES	
Metal Bridge Rails	**Concrete Barriers**
TL-4	**TL-4**
California ST-10	Concrete Barrier Type 80
California ST-20S	Concrete Barrier Type 90**
California ST-30	
California ST-50*	
TL-2	**TL-2**
California ST-40	Concrete Barrier Type 80SW

Test Level 2 (TL-2): Bridges with a speed limit of 45mph or less, crash test with small car and pickup truck at 45 mph
Test Level 4 (TL-4): Bridges with a speed limit of 45mph or more, crash test with small car and pick-up at 62mph and medium size truck at 50mph
* pending FHWA approval.
** Standard Plan is pending FHWA approval.

GET READY

- Caltrans issued a memorandum on November 26, 2008 lowering the minimum height for bicycle bridge rails from 54" to 42" for most applications. Caltrans recommends a minimum height of 48" where a combination of high bicycle speeds and high crash impact angles are anticipated.
- Bridge Rail Development, Design and Selection Guidelines are under review and will be published in 2011.
- *Highway Design Manual* and *Bridge Design Manual* will incorporate guidance on selecting bridge rails in 2011.

COST COMPARISON		
Bridge Rail	**Estimated Cost/LF**	**Cost/Cost 732**
Concrete Barrier Type 732	$88/LF	1.00
California ST-10	$204/LF	2.32
California ST-20S	$297/LF	3.37
California ST-30	—	—
California ST-50	—	—
California ST-40	—	—
Concrete Barrier Type 80	$264/LF	3.00
Concrete Barrier Type 90	—	—
Concrete Barrier Type 80SW	$313/LF	3.55

Concrete Barrier Type 80, modified with architectural treatment and with bicycle rail offset 15" from rail face